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# 4th Generation M3 Service Information

**Model: E90, E92**

**Production: 2/2008**

# OBJECTIVES

After completion of this module you will be able to:

- Understand some specific procedures that must be taken into consideration when servicing the M3.

# Introduction

## M3 Concept

A maximum torque of 400 Newton meters at 3,900 rpm is reached. Approx. 85 percent (340 Nm) can be utilized beyond the enormous engine speed range of 6,500 rpm.

The S65B40 attains 8,400 rpm, and therefore a value that was previously only reserved for racing car engines or exotic custom vehicles.

For safety reasons, due to the engine dynamics when the vehicle is stationary (i.e. without a road-speed signal), it is already down-controlled at 7,000 rpm to prevent the engine speed from increasing into an impermissible range.



# S65B40O0 Engine

## Crankshaft

The identification marking of the bearing shells is engraved on the crankcase and on the first crank web.

## Connecting Rods

The large connecting rod eye is asymmetrically ground to reduce the length of the engine. This means that the installation is direction-specific.

For the workshop, bearing shells are available in a repair stage (for more information, see the service documentation).

## Camshaft Drive

The VANOS adjustment units are an integral component of the valve control and are mounted on the relevant camshaft by a central bolt.

The central bolts of the inlet and exhaust side have a CCW thread, please refer to the repair instructions.

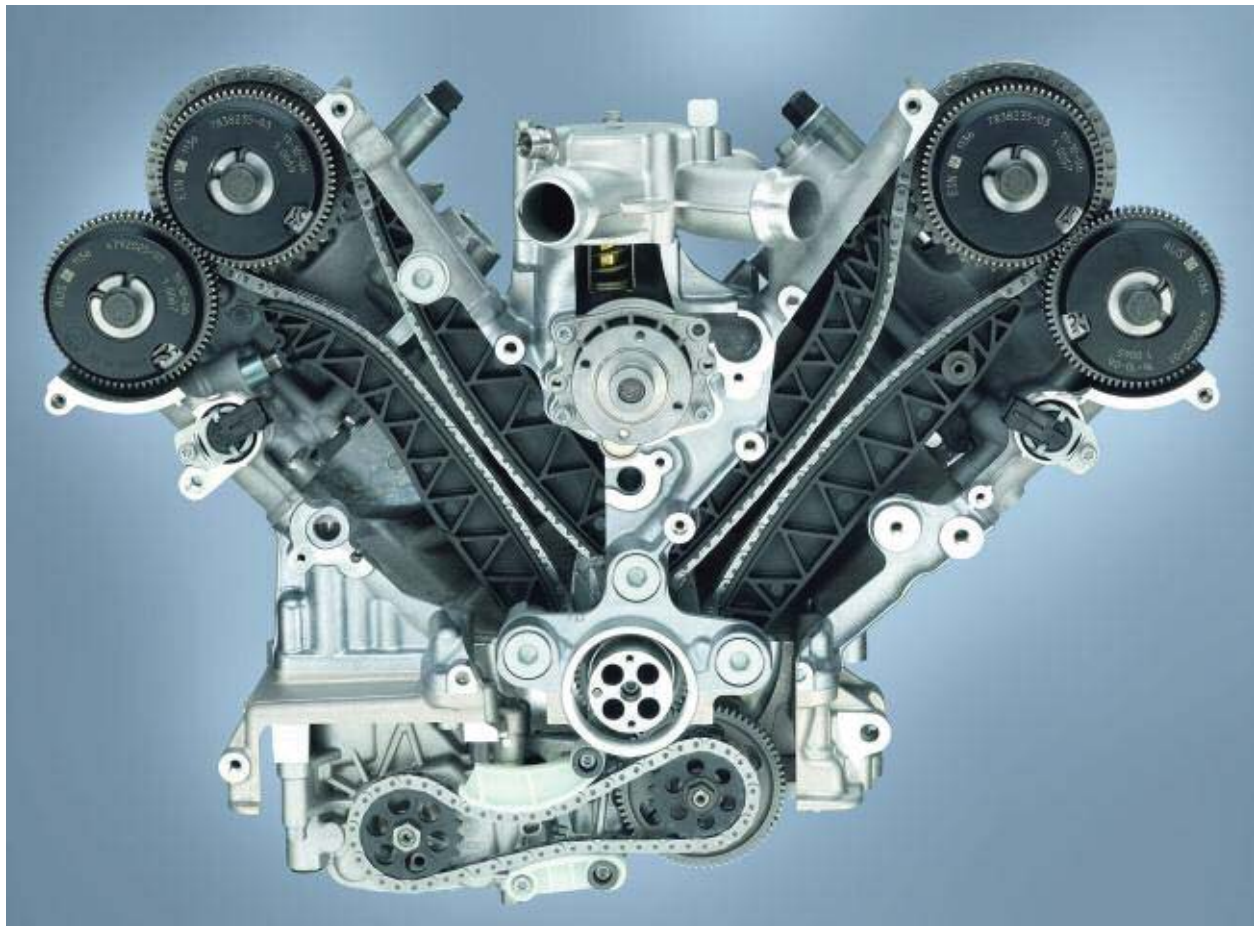


## VANOS

The compact double VANOS system fitted to the S65 engine operates at normal oil pressure, unlike the S85 engine (which uses high oil pressure). The low-pressure system means that the high-pressure pump and additional pressure lines and reservoir are unnecessary.

The setting angle of the inlet camshaft is  $58^\circ$  in relation to the crankshaft. The exhaust camshaft has a setting angle of  $48^\circ$ . As in the S85 engine, this VANOS also reaches an adjustment rate of  $360^\circ$  camshaft per second.

The service instructions should be followed exactly. The VANOS adjustment unit must not be disassembled.



# MSS60 Engine Control System

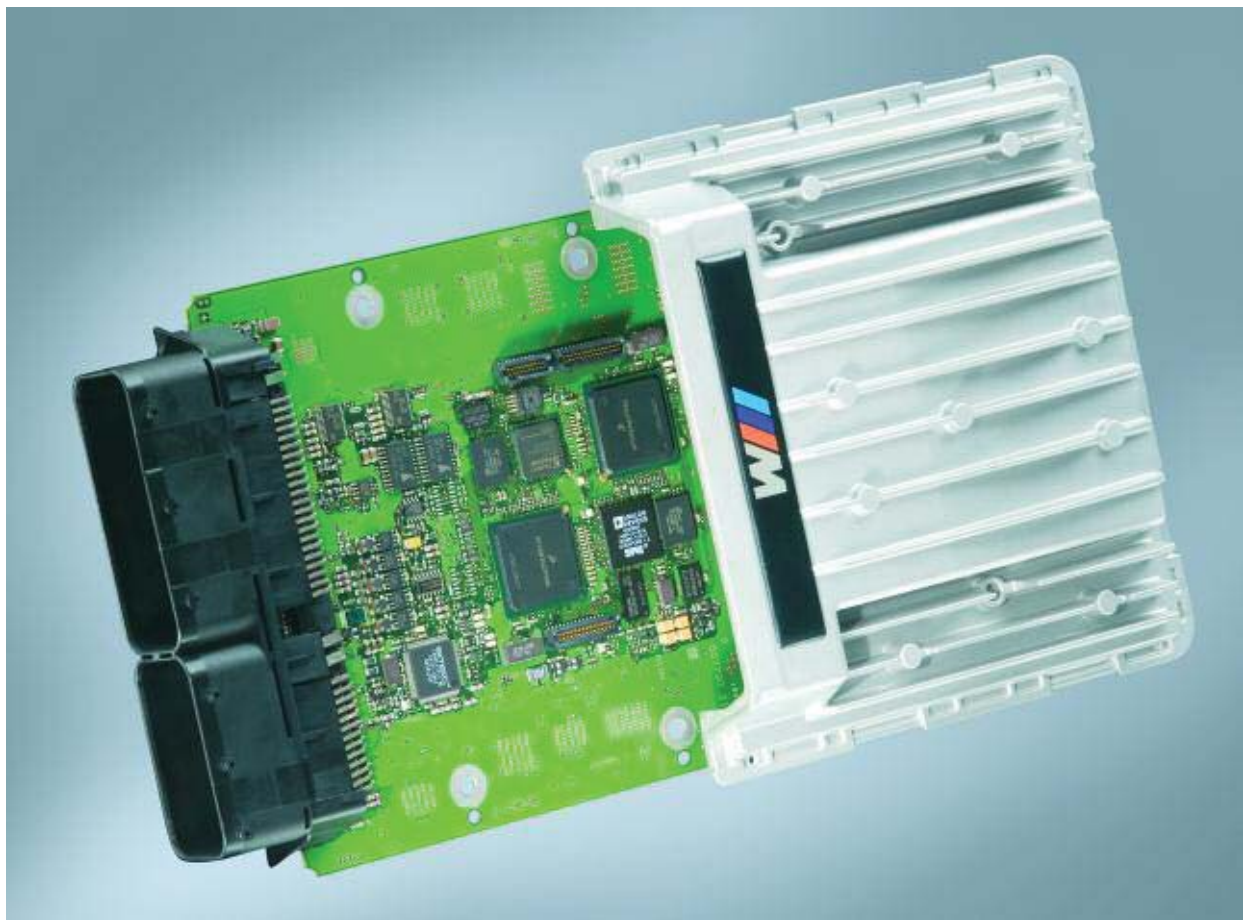
## Ion Current Combustion Monitoring

In the S65, the ion current electronic system is integrated into each ignition coil and the ion current control devices are not required.

For the purposes of smoothing the voltage and electromagnetic compatibility, an "ignition suppression capacitor" is installed in the wiring harness of each cylinder bank (in the S85 this is in the ion current control device). This is electrically connected using terminal 87 and the vehicle earth.

If the ignition suppression capacitor is defective, this can lead to faults in the communications and/or audio electronics when the engine is running.

For design reasons, the firing order 1-5-4-8-7-2-6-3 is used in the S65, instead of the firing order 1-5-4-8-6-3-7-2 more commonly employed in BMW V8 engines.



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## Cooling System

### Fan Operation

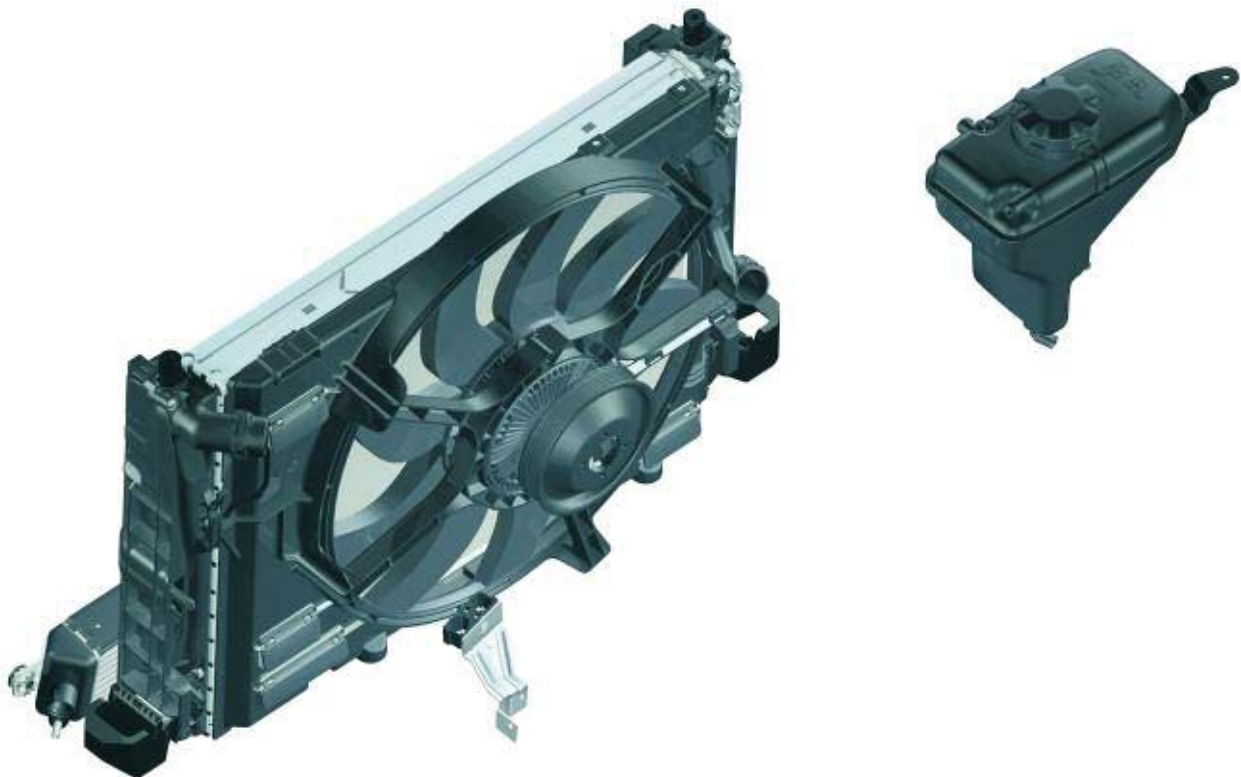
The adjusted fan speed increases in a linear fashion as the cycle ratio increases. The rated speed (nNom) in the M3 is the same as the maximum number of revolutions (2,400 rpm).

The engine speed of the M3 is controlled in a linear relationship with the cycle ratio (10-91%), starting with 800 rpm (1/3 of nNom) up to 2,400 rpm.

In the E6x M5/M6 (600 W fan), from a 92% to 95% cycle ratio, an additional unregulated increase in engine speed to at least 2,700 rpm (nmax) is realized.

### Fan Self-diagnosis and Fault Signal

A fault message is issued with a delay of approximately one minute, since the electronic fan system first executes a triple internal test cycle.



# Drivetrain

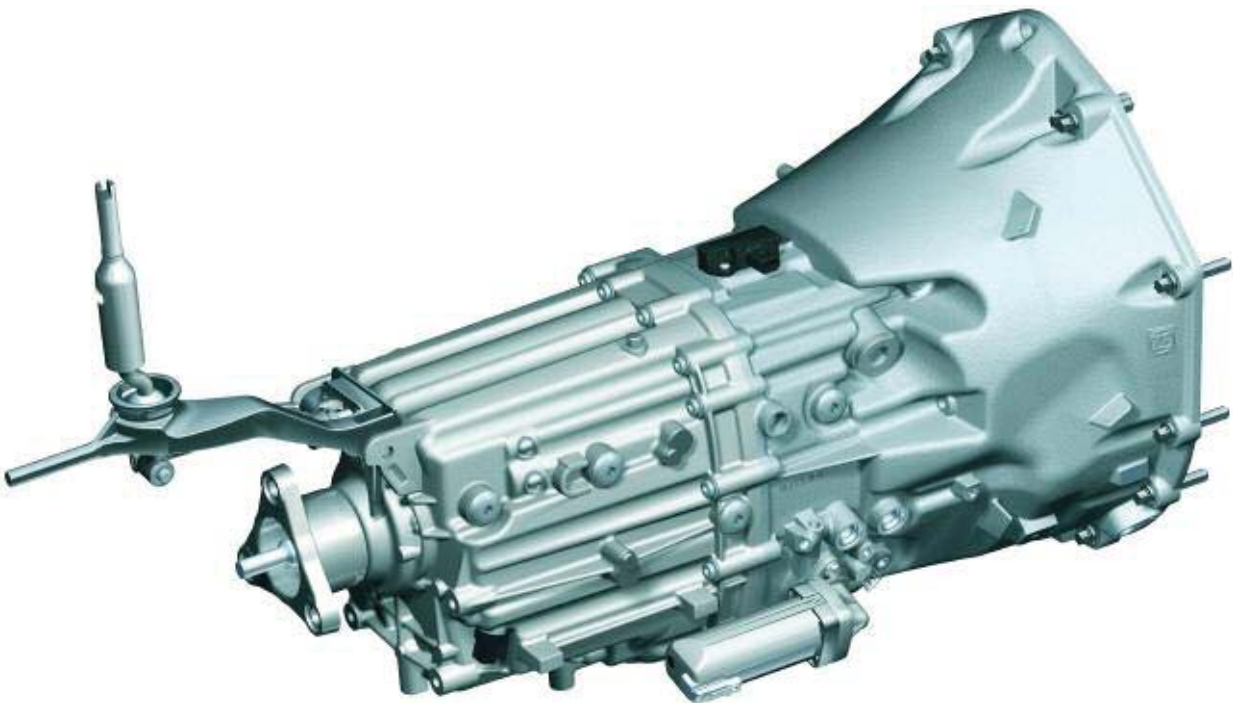
## Manual Transmission GS6-53BZ

The gear oil is replaced and the screw oil filter is checked or cleaned during the running-in inspection, and later according to service specifications (estimated after every third engine oil change).

For fault symptoms with engine speed limitation, the gear oil temperature should also be considered as a possible cause.

## Clutch

The clutch and the dual-mass flywheel are permanently connected and are balanced as a single unit. They can only be replaced in a set.





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## Propeller Shaft

The center bearing can be mounted in two directions. It is important that the bearing is mounted with the word "TOP" facing the body.

## Final Drive

Due to their function, the shafts of the right and left stub axles in the final drive have different lengths. In an idle state, this results in a noticeable different vertical clearance of both flanges, which is a feature of the design.

This does not affect the function and is not a cause for complaint.

This uneven clearance applies for all models with fully variable M slip differential and may affect either the right or the left flange, depending on the version and model.



# Chassis and Suspension

## Swivel Bearing

Spring strut connection to the wheel carrier:

During assembly, the M3 spring strut is pulled into the lower cone using a new special tool.

Follow the new installation and removal process according to the service repair manual.

